EXHIBIT F

CHAIN-OF-CUSTODY, DOCUMENT CONTROL, AND WRITTEN STANDARD OPERATING PROCEDURES

Exhibit F - Chain-of-Custody, Document Control, and Written Standard Operating Procedures

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1.0 INTRODUCTION

1.1 A sample is physical evidence collected from a facility or from the environment. Controlling evidence is an essential part of the hazardous waste investigation effort. To ensure that the Environmental Protection Agency's (EPA) sample data and records supporting sample-related activities are admissible and have weight as evidence in future litigation, Contractors are required to maintain EPA samples under chain-of-custody and to account for all samples and supporting records of sample handling, preparation, and analysis. Contractors shall maintain sample identity, sample custody, and all sample-related records according to the requirements in this exhibit.

1.2 The purposes of the evidence requirements include:

- Ensuring traceability of samples while in the possession of the Contractor.
- Ensuring custody of samples while in the possession of the Contractor.
- Ensuring the integrity of sample identity while in the possession of the Contractor.
- Ensuring sample-related activities are recorded on documents or in other formats for EPA sample receipt, storage, preparation, analysis, and disposal.
- Ensuring all laboratory records for each specified sample delivery group will be accounted for when the project is completed.
- Ensuring that all laboratory records directly related to EPA samples are assembled and delivered to EPA or, prior to delivery, are available upon EPA's request.

2.0 STANDARD OPERATING PROCEDURES

The Contractor shall implement the following standard operating procedures for sample receiving, sample identification, sample security, sample storage, sample tracking and document control, computer-resident sample data control, and complete sample delivery group file organization and assembly to ensure accountability of EPA sample chain-of-custody as well as control of all EPA sample-related records.

2.1 Sample Receiving

2.1.1 The Contractor shall designate a sample custodian responsible for receiving EPA samples.

2.1.2 The Contractor shall designate a representative to receive EPA samples in the event that the sample custodian is not available.

2.1.3 Upon receipt, the condition of shipping containers and sample containers shall be inspected and recorded on Form DC-1 by the sample custodian or his/her representative.

2.1.4 Upon receipt, the condition of the custody seals (intact/broken) shall be inspected and recorded on Form DC-1 by the sample custodian or his/her representative.

2.1.5 The sample custodian or his/her representative shall verify and record on Form DC-1 the presence or absence of the following documents accompanying the sample shipment:

- Custody seals,
- Chain-of-custody records,
- Traffic reports or packing lists,
- Airbills or airbill stickers, and
- Sample tags.

2.1.6 The sample custodian or his/her representative shall verify and record on Form DC-1 the agreement or disagreement of information recorded on all documents received with samples and information recorded on sample containers.

2.1.7 The sample custodian or his/her representative shall record the following information on Form DC-1 as samples are received and inspected:

- Custody seal numbers when present,
- Airbill or airbill sticker numbers,
- Cooler temperature,
- Sample tags listed/not listed on chain-of-custody records,
- Date of receipt,
- Time of receipt,
- EPA sample numbers,
- Sample tag numbers,
- Assigned laboratory numbers,
- Samples delivered by hand, and
- Problems and discrepancies.

2.1.8 The sample custodian or his/her representative shall sign, date, and record the time on all accompanying forms, when applicable, at the time of sample receipt (for example, chain-of-custody records,

traffic reports or packing lists, and airbills). Note: Initials are not acceptable.

2.1.9 The Contractor shall contact the Regional Sample Control Center (RSCC) to resolve problems and discrepancies including but not limited to, absent documents, conflicting information, absent or broken custody seals, and unsatisfactory sample condition (for example, leaking sample container).

2.1.10 The Contractor shall record the resolution of problems and discrepancies discussed with the EPA.

2.2 Sample Identification

2.2.1 The Contractor shall maintain the identity of EPA samples and prepared samples (including extracted samples, digested samples, and distilled samples) throughout the laboratory.

2.2.2 Each sample and sample preparation container shall be labeled with the EPA number or a unique laboratory sample identification number.

2.3 Sample Security

2.3.1 The Contractor shall demonstrate that EPA sample custody is maintained from receiving through retention or disposal. A sample is in custody if:

- It is in your possession; or
- It is in your view after being in your possession; or
- It is locked in a secure area after being in your possession; or
- It is in a designated secure area. (Secure areas shall be accessible only to authorized personnel.)

2.3.2 The Contractor shall demonstrate security of designated secure areas.

2.4 Sample Storage

The Contractor shall designate storage areas for EPA samples and prepared samples.

2.5 Sample Tracking and Document Control

2.5.1 The Contractor shall record all activities performed on EPA samples.

2.5.2 Titles which identify the activities recorded shall be printed on each page of all laboratory documents. (Activities include, but are not limited to, sample receipt, sample storage, sample preparation, and sample analysis.) When a document is a record of analysis, the instrument type and parameter group (for example, GC/MS-VOA) shall be included in the title.

2.5.3 When columns are used to organize information recorded on laboratory documents, the information recorded in the columns shall be identified in a column heading.

2.5.4 Reviewers' signatures shall be identified on laboratory documents when reviews are conducted. Note: Individuals recording review comments on computer-generated raw data are not required to be identified unless the written comments address data validity.

2.5.5 The laboratory name shall be identified on preprinted laboratory documents.

2.5.6 Each laboratory document entry shall be dated with the month/day/year (for example, 01/01/95) and signed (or initialed) by the individual(s) responsible for performing the recorded activity at the time the activity is recorded.

2.5.7 Notations on laboratory documents shall be recorded in ink.

2.5.8 Corrections to laboratory documents and raw data shall be made by drawing single lines through the errors and entering the correct information. Information shall not be obliterated or rendered unreadable. Corrections and additions to information shall be signed (or initialed) and dated.

2.5.9 Unused portions of laboratory documents shall be lined-out.

2.5.10 Pages in bound and unbound logbooks shall be sequentially numbered.

2.5.11 Instrument-specific run logs shall be maintained to enable the reconstruction of run sequences.

2.5.12 Logbook entries shall be in chronological order.

2.5.13 Logbook entries shall include only one Sample Delivery Group (SDG) per page, except in the events where the SDGs "share" QC samples (for example, instrument run logs and extraction logs).

2.5.14 Information inserted into laboratory documents shall be affixed permanently in place. The individual responsible for inserting information shall sign and date across the insert and logbook page at the time information is inserted.

2.5.15 The Contractor shall document disposal or retention of EPA samples, remaining portions of samples, and prepared samples.

2.6 Computer-Resident Sample Data Control

2.6.1 Contractor personnel responsible for original data entry shall be identified at the time of data input.

2.6.2 The Contractor shall make changes to electronic data in a manner which ensures that the original data entry is preserved, the editor is identified, and the revision date is recorded.

2.6.3 The Contractor shall routinely verify the accuracy of manually entered data, electronically entered data, and data acquired from instruments.

2.6.4 The Contractor shall routinely verify documents produced by the electronic data collection system to ensure accuracy of the information reported.

2.6.5 The Contractor shall ensure that the electronic data collection system is secure.

2.6.5.1 The electronic data collection system shall be maintained in a secure location.

2.6.5.2 Access to the electronic data collection system functions shall be limited to authorized personnel through utilization of software security techniques (for example, log-ons or restricted passwords).

2.6.5.3 Electronic data collection systems shall be protected from the introduction of external programs or software (for example, viruses).

2.6.6 The Contractor shall designate archive storage areas for electronic data and the software required to access the data.

2.6.7 The Contractor shall designate an individual responsible for maintaining archives of electronic data including the software.

2.6.8 The Contractor shall maintain the archives of electronic data and necessary software in a secure location. (Secure areas shall be accessible only to authorized personnel.)

2.7 Complete Sample Delivery Group File (CSF) Organization and Assembly

2.7.1 The Contractor shall designate a document control officer responsible for the organization and assembly of the CSF.

2.7.2 The Contractor shall designate a representative responsible for the organization and assembly of the CSF in the event that the document control officer is not available.

2.7.3 The Contractor shall maintain documents relating to the CSF in a secure location.

2.7.4 All original laboratory forms and copies of SDG-related logbook pages shall be included in the CSF.

2.7.5 Copies of laboratory documents in the CSF shall be photocopied in a manner to provide complete and legible replicates.

2.7.6 Documents relevant to each SDG including, but not limited to, the following shall be included in the CSF:

- logbook pages,
- benchsheets,
- mass spectra,
- chromatograms,
- screening records,
- preparation records,
- re-preparation records,
- analytical records,
- re-analysis records,
- records of failed or attempted analysis,
- custody records,
- sample tracking records,
- raw data summaries,
- computer printouts,
- correspondence,
- FAX originals,
- library search results, and
- other.

2.7.7 The document control officer or his/her representative shall ensure that sample tags are encased in clear plastic bags before placing them in the CSF.

2.7.8 CSF documents shall be organized and assembled on an SDG-specific basis.

2.7.9 Original documents which include information relating to more than one SDG (for example, chain-of-custody records, traffic reports, calibration logs) shall be filed in the CSF of the lowest SDG number, and copies of these originals shall be placed in the other CSF(s). The document control officer or his/her representative shall record the following statement on the copies in dark ink:

COPY
ORIGINAL DOCUMENTS ARE INCLUDED IN CSF _____

_____
Signature

_____
Date

2.7.10 All CSFs shall be submitted with a completed Form DC-2. All resubmitted CSFs shall be submitted with a new or revised Form DC-2.

2.7.11 Each item in the CSF and resubmitted CSFs shall be inventoried and assembled in the order specified on Form DC-2. Each page of the CSF shall be stamped with a sequential number. Page number ranges shall be recorded in the columns provided on Form DC-2. Intentional gaps in the page numbering sequence shall be recorded in the "Comments" section on Form DC-2. When inserting new or inadvertently omitted documents, the Contractor shall identify them with unique accountable numbers. The unique accountable numbers and the locations of the documents shall be recorded in the "Other Records" section on Form DC-2.

2.7.12 Before shipping each CSF, the document control officer or his/her representative shall verify the agreement of information recorded on

all documentation and ensure that the information is consistent and the CSF is complete.

2.7.13 The document control officer or his/her representative shall document the shipment of deliverable packages including what was sent, to whom, the date, and the carrier used.

2.7.14 Shipments of deliverable packages, including resubmittals, shall be sealed with custody seals by the document control officer or his/her representative in a manner such that opening the packages would break the seals.

2.7.15 Custody seals shall be signed and dated by the document control officer or his/her representative when sealing deliverable packages.

3.0 WRITTEN STANDARD OPERATING PROCEDURES (SOPS)

The Contractor shall develop and implement the following written SOPs for sample receiving, sample identification, sample security, sample storage, sample tracking and document control, computer-resident sample data control, and CSF file organization and assembly to ensure accountability for EPA sample chain-of-custody and control of all EPA sample-related records.

3.1 Sample Receiving

3.1.1 The Contractor shall have written SOPs for sample receiving which accurately reflect the procedures used by the laboratory.

3.1.2 The written SOPs for sample receiving shall ensure that the procedures listed below are in use at the laboratory.

3.1.2.1 The condition of shipping containers and sample containers are inspected and recorded on Form DC-1 upon receipt by the sample custodian or his/her representative.

3.1.2.2 The condition of custody seals are inspected and recorded on Form DC-1 upon receipt by the sample custodian or his/her representative.

3.1.2.3 The presence or absence of the following documents accompanying the sample shipment is verified and recorded on Form DC-1 by the sample custodian or his/her representative:

- Custody seals,
- Chain-of-custody records,
- Traffic reports or packing lists,
- Airbills or airbill stickers, and
- Sample tags.

3.1.2.4 The agreement or disagreement of information recorded on shipping documents with information recorded on sample containers is verified and recorded on Form DC-1 by the sample custodian or his/her representative.

3.1.2.5 The following information is recorded on Form DC-1 by the sample custodian or his/her representative as samples are received and inspected:

- Custody seal numbers when present,
- Airbill or airbill sticker numbers,
- Sample tag numbers listed/not listed on chain-of-custody records,
- Date of receipt,
- Time of receipt,
- EPA sample numbers,
- Sample tag numbers,
- Assigned laboratory numbers,
- Samples delivered by hand, and
- Problems and discrepancies.

3.1.2.6 All accompanying forms are signed, dated, and the time is recorded, when applicable, at the time of sample receipt (for example, chain-of-custody records, traffic reports or packing

lists, and airbills) by the sample custodian or his/her representative.

3.1.2.7 The RSCC is contacted to resolve problems and discrepancies including, but not limited to, absent documents, conflicting information, absent or broken custody seals, and unsatisfactory sample condition (for example, leaking sample container).

3.1.2.8 The resolution of problems and discrepancies discussed with the EPA is recorded.

3.2 Sample Identification

3.2.1 The Contractor shall have written SOPs for sample identification which accurately reflect the procedures used by the laboratory.

3.2.2 The written SOPs for sample identification shall ensure that the procedures listed below are in use at the laboratory.

3.2.2.1 The identity of EPA samples and prepared samples is maintained throughout the laboratory:

- When the Contractor assigns unique laboratory sample identification numbers, the written SOPs shall include a description of the procedure used to assign these numbers,
- When the Contractor uses prefixes or suffixes in addition to laboratory sample identification numbers, the written SOPs shall include their definitions, and
- When the Contractor uses methods to uniquely identify fractions/parameter groups and matrix type, the written SOPs shall include a description of these methods.

3.2.2.2 Each sample and sample preparation container is labeled with the EPA number or a unique laboratory sample identification number.

3.3 Sample Security

3.3.1 The Contractor shall have written SOPs for sample security which accurately reflect the procedures used by the laboratory.

3.3.2 The written SOPs for sample security shall include the items listed below.

3.3.2.1 Procedures which ensure the following:

- Sample custody is maintained, and
- The security of designated secure areas is maintained.

3.3.2.2 A list of authorized personnel who have access to locked storage areas.

3.4 Sample Storage

3.4.1 The Contractor shall have written SOPs for sample storage which accurately reflect the procedures used by the laboratory.

3.4.2 The written SOPs for sample storage shall describe locations, contents, and identities of all storage areas for EPA samples and prepared samples in the laboratory.

3.5 Sample Tracking and Document Control

3.5.1 The Contractor shall have written SOPs for sample tracking and document control which accurately reflect the procedures used by the laboratory.

3.5.2 The written SOPs for sample tracking and document control shall include the items listed below.

3.5.2.1 Examples of all laboratory documents used during sample receiving, sample storage, sample transfer, sample analyses, CSF organization and assembly, and sample retention or disposal.

3.5.2.2 Procedures which ensure the following:

- All activities performed on EPA samples are recorded;
- Titles which identify the activities recorded are printed on each page of all laboratory documents;
- Information recorded in columns is identified with column headings;
- Reviewers' signatures are identified on laboratory documents;
- The laboratory name is included on preprinted laboratory documents;
- Laboratory document entries are signed and dated with the month/day/year (for example, 01/01/95);
- Entries on all laboratory documents are recorded in ink;
- Corrections and additions to laboratory documents are made by drawing single lines through the errors, entering the correct information, and initialing and dating the new information;
- Unused portions of laboratory documents are lined-out;
- Pages in bound and unbound logbooks are sequentially numbered;
- Instrument-specific run logs are maintained to enable the reconstruction of run sequences;
- Logbook entries are recorded in chronological order;
- Entries are recorded for only one SDG on a page, except in the events where SDGs "share" quality control (QC) samples (for example, instrument run logs and extraction logs);
- Information inserted in laboratory documents is affixed permanently, signed, and dated across the insert; and
- The retention or disposal of EPA samples, remaining portions of samples, and prepared samples is documented.

3.6 Computer-Resident Sample Data Control

3.6.1 The Contractor shall have written SOPs for computer-resident sample data control which accurately reflect the procedures used by the laboratory.

3.6.2 The written SOPs for computer-resident sample data control shall include the items listed below.

3.6.2.1 Procedures which ensure the following:

- Contractor personnel responsible for original data entry are identified;
- Changes to electronic data are made such that the original data entry is preserved, the editor is identified, and the revision date is recorded;
- The accuracy of manually entered data, electronically entered data, and data acquired from instruments is verified;
- Report documents produced by the electronic data collection system are routinely verified to ensure the accuracy of the information reported;
- Electronic data collection system security is maintained; and

- Archives of electronic data and accompanying software are maintained in a secure location.

3.6.2.2 Descriptions of archive storage areas for the electronic data and the software required to access data archives.

3.6.2.3 A list of authorized personnel who have access to electronic data collection system functions and to archived data.

3.7 CSF Organization and Assembly

3.7.1 The Contractor shall have written SOPs for CSF organization and assembly which accurately reflect the procedures used by the laboratory.

3.7.2 The written SOPs for CSF organization and assembly shall ensure that the procedures listed below are in use at the laboratory.

- Documents relating to the CSF are maintained in a secure location.
- All original laboratory forms and copies of SDG-related logbook pages are included in the CSF.
- Laboratory documents are photocopied in a manner to provide complete and legible replicates.
- All documents relevant to each SDG are included in the CSF.
- Sample tags are encased in clear plastic bags by the document control officer or his/her representative before placing them in the CSF.
- The CSF is organized and assembled on an SDG-specific basis.
- Copies are referenced to originals in the event that an original document contains information relating to more than one SDG.
- Each CSF is submitted with a completed Form DC-2, and resubmitted CSFs are submitted with a new or revised Form DC-2.
- Each page of the CSF is stamped with a sequential number and the page number ranges are recorded in the columns provided on Form DC-2.
- Consistency and completeness of the CSF is verified by the document control officer or his/her representative.
- Shipments of deliverable packages are documented by the document control officer or his/her representative.
- Deliverable packages are shipped by the document control officer or his/her representative using custody seals in a manner such that opening the packages would break the seals.
- Custody seals are signed and dated by the document control officer or his/her representative before placing them on deliverable packages.